We claim:

1. **A method** for bonding two semiconductor wafers (1,10) by a semiconductor wafer bonding process (1,4,10), comprising:
   - providing a periphery or edge geometry (7) including a particularly short front side facet (3a,3b,L2) in the two semiconductor wafers (1,10) to bonded at the surfaces to be bonded in order to obtain an edge region (7,K) having as low a number of defects as possible and to obtain a usable wafer surface as large as possible after the thinning of one (1) of the two wafers, in particular after the separation, splitting off or grinding.

2. The method for bonding according to the preceding claim, wherein at least one of the surfaces to be bonded includes at least one prepared layer or structures, which are transferred by the bonding (4) and a subsequent thinning, in particular a grinding, splitting off or separating, from one (10) of the wafers to the other one (1).

3. The method for bonding according to the preceding claim, wherein the other one (1) of the wafers is a donator wafer or a top wafer.

4. The method for bonding of claim 2, wherein the one (10) of the wafers is a device wafer or a handle wafer.

5. The method for bonding of claim 2, wherein both surfaces to be bonded each include a prepared layer or structures.

6. The method for bonding of claim 1, wherein said specifically short front side facet has a length (L2), measured in the direction of the surface, of less than approximately 75µm, in particular for a diameter of the wafers to be bonded in the range of 100mm to 300mm.

7. The method for bonding of claim 1, wherein the two wafers to be bonded (1, 10) have a diameter in the range of 300mm to 500mm, and both wafers have substantially the same diameter prior to the bonding and the thinning of the one (1) wafer.

8. The method for bonding of claim 1, wherein the bond surfaces are connected via a laminar bond interface (4).

9. The method for bonding of the preceding claim or of claim 1, wherein the front sides of the semiconductor wafers (1, 10) are the oppositely arranged surfaces to be bonded to each other via the bond interface (4).

10. The method for bonding of claim 1, wherein the edge geometry (7; 6, 3a, 3b) surrounds the bond interface (4) at the periphery.

11. The method for bonding of claim 1, wherein said edge region (K) having as low a number of defects as possible is less than 7mm for a diameter (D1) of the semiconductor wafers of 150mm, and is particularly less than 9% of the wafer surface.

12. The method for bonding of the preceding claim, wherein said edge region (K) having as low a number of defects as possible is less approximately 5% of the wafer surface, and in particular is less than 2.6% or approximately 2% of the wafer surface.

13. The method for bonding of the preceding claim, wherein said edge region (K) having as low a number of defects as possible is less approximately 1mm for a diameter (D1) of the semiconductor wafer of approximately 150mm.

14. The method for bonding of claim 1, wherein at the periphery or edge geometry (7) at the end thickness (d1) of the thinned one (1) of the wafers a substantially perpendicular section (7a) or portion is provided that is formed from the edge facet of the thinned wafer.

15. The method for bonding of the preceding claim, wherein said section (7a) is oriented perpendicularly to the laminar bond interface (4) or to the wafer surface.

16. The method for bonding of claim 1, wherein said two semiconductor wafers (1,10) have substantially the same dimensions in the direction of the bond or wafer surfaces, and in particular said two semiconductor wafers have substantially the same diameter corresponding to a rated dimension.

17. The method for bonding of the preceding claim, wherein said two semiconductor wafers have the same diameter (D1).

18. The method for bonding of claim 1, wherein said periphery or edge geometry (7) comprises two differently inclined facets (6a, 3a) that are inclined in a range less than 90° and greater than 0° with respect to said bond interface (4).

19. The method for bonding of the preceding claim, wherein said bond interface or the wafer surface defines the reference plane.

20. **An assembly** as a composite of two semiconductor wafers (1,10) connected by a semiconductor bonding process, in which the bonded wafers are provided at the bonded surfaces with an edge geometry having a specific short front side facet (3a, 3b, L2) less than 75µm for a wafer diameter ranging from 100m to 300mm so as to obtain an edge region (7) being as devoid of defects as possible and a usable wafer surface as large as possible after the thinning, in particular after the separation or splitting off, of one of the wafers.

21. The assembly of the preceding claim, wherein one or both of the surfaces to bonded include prepared layers or structures, which are transferred by the bonding and the subsequent thinning/separating of one wafer (often referred to as donator wafer or top wafer) to the other wafer (often referred to as device wafer or handle wafer).

22. The assembly of the preceding claim 20, wherein the thinning comprises a separating process.

23. The assembly of the preceding claim 20, comprising one or more structural features of the claims 1 to 19, also including features without a respective reference to the related dependent claims.

24. **A method** for bonding two semiconductor wafers by a semiconductor bonding process, in which the wafers to be bonded (1,10) are provided at the surfaces to be bonded with an edge geometry having a specially short front side facet (< 75µm for wafers having a diameter from 100mm to 300mm or to 450mm) in order to obtain an edge region being as devoid of defects as possible (7) and a usable wafer surface that is as large as possible after the thinning/separation/splitting off/grinding of one of the wafers.

25. The method for bonding according to the preceding claim, wherein one or both of the surfaces to bonded include prepared layers or structures, which are

transferred by the bonding and the subsequent thinning of one wafer (often referred to as donator wafer or top wafer) to the other one (10) of the wafers (often referred to as device wafer or handle wafer).

26. **An assembly** for bonding two semiconductor wafers by a semiconductor bonding process, in which the wafers to be bonded (1, 10) are provided at the surfaces to be bonded with an edge geometry having a specially short front side facet (< 75µm for wafers having a diameter from 100mm to 300mm or to 450mm) in order to obtain a usable wafer surface that is as large as possible after the thinning/separation/splitting off/grinding of one of the wafers.

27. The assembly for bonding according to the preceding claim, wherein one or both of the surfaces to bonded include prepared layers or structures, which are transferred by the bonding and the subsequent thinning/separating/splitting off of one wafer (often referred to as donator wafer or top wafer) to the other one of the wafers (often referred to as device wafer or handle wafer).

28. The method or the assembly of claim 1 or 20, wherein first oblique faces formed from the specially shorter facets (3a, 3b) are shorter than second oblique faces (6a, 6b) located radially further inwardly and originating from an edge roll-off process, the dimensions being measured along a direction of extension of the respective oblique face of the respective semiconductor wafer.

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